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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 10/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/081,691

Applicant(s)

CHENG ET AL.

Examiner

Harry D Wilkins, III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 16-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: *Requirement for Information*.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-15, drawn to an electrolytic cell, classified in class 204, subclass 275.1.
 - II. Claims 16-20, drawn to a method of making an electrolytic cell including vapor deposition, classified in class 427, subclass 585.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the process as claimed can be used to make a materially different product, such as by making a disposable working electrode that is not readily removable.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with David Brezner on 15 September 2003 a provisional election was made with traverse to prosecute the invention of group I, claims 1-15. Affirmation of this election must be made by applicant in replying to this Office

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action. Claims 16-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. The term "readily removable" in claim 1 is a relative term which renders the claim indefinite. The term "readily removable" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear how easy it must be for the working electrode to be removed from the cell in order to be considered "readily removable". As no requisite degree of ease has been defined for the removability, any removable structure will be considered "readily removable".

9. Claim 3 recites the limitation "said contact region" in line 3. There is insufficient antecedent basis for this limitation in the claim. It appears that this claim should depend from claim 2, which would provide antecedent basis. Further examination will be based upon this assumption.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 1, 4-6, 8, 10 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admission of prior art (APA) in view of Finn (GB 2122354).

Applicant admits as prior art (see pages 1 and 2 and page 4, lines 6-11) that there existed a flow-through electrochemical cell, known by the trademark ED40, that included a plastic gasket (i.e.-perimeter wall) defining a sample flow channel and a working electrode with an electrically conductive and electrochemically active region

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with the working electrode being in fluid communication with the sample flow channel.

There is an implicit disclosure of a sample inlet line in fluid communication with said sample flow channel and an outlet line providing fluid communication between the sample flow channel outlet and a remote reference electrode.

However, Applicant's admission of prior art does not teach or suggest using a "disposable" working electrode where the active working electrode region is bound as a layer on an electrically insulating substrate, where the substrate is in fluid-sealing relationship with the sample flow channel.

Finn teaches (see Fig. 1, abstract, page 1, lines 52-65 and 114-124 and page 2, lines 4-22) a removable working electrode for a flow-through electrochemical cell that comprises an active working electrode bound directly as a layer on an insulating substrate, where the substrate (17A) forms a fluid seal with the sample flow channel (18). This electrode is made of PTFE where the active working electrode is a gold membrane (layer), and thus would be considered "disposable" as the majority element is plastic.

Therefore, it would have been obvious to one of ordinary skill in the art to have substituted the insulating substrate/metal membrane working electrode of Finn for the standard working electrode of the prior art ED40 electrochemical cell because the insulating substrate (PTFE)/metal membrane would be cheap and easy to make (compared to the prior art ED40 working electrode).

Regarding claim 4, Applicant's APA discloses (see page 1) that the perimeter wall comprises a gasket forming a fluid-tight seal around the sample flow channel.

Regarding claim 5, Applicant's APA does not disclose any intervening layers between the working electrode region and the sample flow channel.

Regarding claim 6, while Finn contains no express recitation of the thickness of the working electrode region, it would have been within the expected skill of a routineer in the art to have optimized the thickness of the electrode region to ensure proper electrical conductivity and electrochemical activity.

Regarding claim 8, Finn teaches (see page 1, line 53) that the substrate is PTFE (polytetrafluoroethylene (Teflon®)), an organic polymer.

Regarding claim 10, Finn teaches (see page 1, lines 54-56) that the working electrode region comprises a metal (Au or Pt).

Regarding claim 15, Applicant admits as prior art that the ED40 had been connected to a liquid chromatographic separator.

*(see page 4, lines 8-11 and page 8, lines 17-26)
HWR
10/2/03*

13. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's APA in view of Finn (GB 2122354) as applied to claims 1, 4-6, 8, 10 and 15 above, and further in view of Wickersham (US 3,654,585).

The teachings of Applicant's APA and Finn are described above in paragraph no.12.

Applicant's APA in view of Finn do not teach an electrically conductive contact region and a lead bound as a layer on the substrate surface where the contact region is out of fluid contact with the sample flow channel nor an electrically conductive connection pin having a first end in removable contact with said contact region and a second end adapted for electrical connection to a power source.

Wickersham teaches (see Figs. 1, 5, 7 and 11 and col. 5, lines 37-57) means for making a removable electrical connection between a substrate (28) and an electrical source by means of contact regions (64) spaced apart from the electricity destination (80) by means of leads (76), where the contact regions are contacted by a connection pin (46) which has an opposite end (44) for connecting to a power source.

Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the electrical connection means taught by Wickersham for the working electrode of Finn by adding an electrical contact region with a lead and adding a connection pin for removable contact because the removable connection would allow for easy removal of the working electrode and the connection pin provides good contact between the contact region and the power source. Also, by using a lead, it would allow the contact region and the connection pin to be placed outside of fluid contact with the sample flow channel, thus ensuring more accurate flow conditions in the sample flow channel.

14. Claims 7, 9 and 11-14 rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's APA in view of Finn (GB 2122354) as applied to claims 1, 4-6, 8, 10 and 15 above, and further in view of Go et al (US 5,104,820).

Regarding claim 7, Applicant's APA and Finn do not teach the means by which the metal layer of the electrode region is formed. However, Go et al teach (see paragraph spanning cols. 12 and 13) means for forming a Au electrically conductive layer including the use of sputtering (PVD). Therefore, it would have been obvious to one of ordinary skill in the art to have used sputtering, as taught by Go et al, for forming

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the metal layer of Finn because sputtering is able to produce smooth, consistent and thin layers of metal on many different substrates.

Regarding claim 9, Finn does not teach that the organic polymer of the substrate is one of polyester, polycarbonate, polyolefin, polyimide or polyetherimide. However, it would have been within the expected skill of a routineer in the art to have substituted any equivalent plastic substrate for the PTFE of Finn, such as the polyimide layer taught by Go et al (see paragraph spanning cols. 12 and 13).

Regarding claims 11-14, Finn does not teach using an intermediate adhesion layer to bind the working electrode region to the substrate. However, Go et al teach (see paragraph spanning cols. 12 and 13) that a Ti-W alloy layer is formed on the polyimide substrate by sputtering and then a gold layer is formed on top of the Ti-W layer by sputtering because the Ti-W layer provides adhesion of the gold to the polyimide substrate. Therefore, it would have been obvious to one of ordinary skill in the art to have used a Ti-W adhesion layer to between the working electrode region and the substrate in order to ensure better adhesion between the gold electrode and the plastic substrate. Go et al teach that the adhesion layer is preferably 0.2 microns thick (2000 Å).

Conclusion

15. This Office action has an attached requirement for information under 37 CFR 1.105. A complete reply to this Office action must include a complete reply to the attached requirement for information. The time period for reply to the attached requirement coincides with the time period for reply to this Office action.

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16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-Th 10:00am-8:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

hdw

Harry D Wilkins, III
Examiner
Art Unit 1742

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

Requirement for Information

1. Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.
2. In response to this requirement, please provide the title, citation and copy of each publication that any of the applicants relied upon to develop the disclosed subject matter that describes the applicant's invention, particularly as to the starting point prior art ED40 apparatus. In particular, the Examiner requires more information about the prior art ED40 apparatus as it appears to be greatly pertinent to the subject matter of claims 1-15, particularly in view of Applicant's recitation at page 4, lines 6-11 that state that "Most of the components of this cell can be similar to a conventional electrochemical cell such as the ED40 cell of Dionex Corporation, with the exception that the disposable working electrode structure replaces a generally permanent electrode structure which is periodically reconditioned as by polishing." For each publication, please provide a concise explanation of the reliance placed on that publication in the development of the disclosed subject matter.
3. The fee and certification requirements of 37 CFR 1.97 are waived for those documents submitted in reply to this requirement. This waiver extends only to those documents within the scope of this requirement under 37 CFR 1.105 that are included in the applicant's first complete communication responding to this requirement. Any supplemental replies subsequent to the first communication responding to this requirement and any information disclosures beyond the scope of this requirement

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under 37 CFR 1.105 are subject to the fee and certification requirements of 37 CFR 1.97.

4. The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR 1.56. Where the applicant does not have or cannot readily obtain an item of required information, a statement that the item is unknown or cannot be readily obtained will be accepted as a complete reply to the requirement for that item.

5. This requirement is an attachment of the enclosed Office action. A complete reply to the enclosed Office action must include a complete reply to this requirement. The time period for reply to this requirement coincides with the time period for reply to the enclosed Office action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-Th 10:00am-8:30pm.

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hdw

Harry D Wilkins, III
Examiner
Art Unit 1742

ROY KING 
SUPERVISORY PATENT EXAMINER
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